

WHAT IS CLAIMED IS:

1 1. A method of processing a packet comprising:
2 populating a plurality of multi-feature packet processing rules in a multi-
3 feature classification memory; and
4 populating an associated content-addressable memory with a plurality of
5 indices of said plurality of multi-feature packet processing rules in said
6 multi-feature classification memory.

1 2. The method of claim 1, further comprising:
2 identifying a classification of said packet; and
3 using said classification to identify said multi-feature packet processing rule.

1 3. The method of claim 2, wherein said classification is based on a
2 plurality of parameters of said packet.

1 4. The method of claim 2, further comprising:
2 receiving said packet;
3 finding a match for said classification in said associated content-addressable
4 memory; and
5 receiving one of said indices from said associated content-addressable
6 memory for one of said multi-feature packet processing rules in said
7 multi-feature classification memory.

1 5. The method of claim 4, further comprising:
2 using said index to receive said multi-feature packet processing rule from said
3 multi-feature classification memory.

1 6. The method of claim 4, wherein said content-addressable memory is a
2 multi-feature content addressable memory.

1 7. The method of claim 4, wherein said content-addressable memory is a
2 feature based content-addressable memory bank.

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1 8. The method of claim 7, wherein said multi-feature packet processing
2 rules are populated in said multi-feature classification memory according to a feature
3 hierarchy.

1 9. A method of processing a packet comprising:
2 identifying a classification of said packet; and
3 locating a multi-feature packet processing rule in a multi-feature classification
4 memory using said classification.

1 10. The method of claim 9, further comprising:
2 processing said packet according to said multi-feature packet processing rule.

1 11. The method of claim 9, wherein said classification is based on a
2 plurality of parameters of said packet.

1 12. The method of claim 10, further comprising:
2 receiving said packet;
3 finding a match for said classification in a content-addressable memory; and
4 receiving an index from said content-addressable memory for said multi-
5 feature packet processing rule in said multi-feature classification
6 memory.

1 13. The method of claim 12, further comprising:
2 using said index to receive said multi-feature packet processing rule from said
3 multi-feature classification memory.

1 14. The method of claim 12, wherein said content-addressable memory is a
2 multi-feature content addressable memory.

1 15. The method of claim 12, wherein said content-addressable memory is a
2 feature based content-addressable memory bank.

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1 16. The method of claim 12, wherein said multi-feature packet processing
2 rules are populated in said multi-feature classification memory according to a feature
3 hierarchy.

1 17. A packet processing rule lookup system comprising:
2 a content-addressable memory; and
3 a multi-feature classification memory coupled to said content-addressable
4 memory, wherein said multi-feature classification memory includes a
5 plurality of packet processing rules for a plurality of features.

1 18. A network element comprising the packet processing rule lookup
2 system of claim 8.

1 19. The network element of claim 18, further comprising:
2 a processor coupled to said multi-feature classification memory, said processor
3 is configured to process a plurality of packets according to said
4 plurality of packet processing rules.

1 20. The network element of claim 19, further comprising:
2 a network interface coupled to said processor, said network interface is
3 configured to provide input output interface for said network element;
4 and
5 a memory coupled to said processor, said memory is configured to store
6 information.

1 21. The network element of claim 19, wherein said content-addressable
2 memory is a multi-feature content addressable memory.

1 22. The network element of claim 19, wherein said content-addressable
2 memory is a feature based content-addressable memory bank.

23. The network element of claim 19, wherein said multi-feature packet processing rules are populated in said multi-feature classification memory according to a feature hierarchy.

24. A network element comprising:
means for populating a plurality of multi-feature packet processing rules in a multi-feature classification memory; and
means for populating an associated content-addressable memory with a plurality of indices of said plurality of multi-feature packet processing rules in said multi-feature classification memory.

25. The network element of claim 24, further comprising:
means for identifying a classification of said packet; and
means for using said classification to identify said multi-feature packet processing rule.

26. The network element of claim 25, wherein said classification is based on a plurality of parameters of said packet.

27. The network element of claim 25, further comprising:
means for receiving said packet;
means for finding a match for said classification in said associated content-addressable memory; and
means for receiving one of said indices from said associated content-addressable memory for one of said multi-feature packet processing rules in said multi-feature classification memory.

28. The network element of claim 27, further comprising:
means for using said index to receive said multi-feature packet processing rule from said multi-feature classification memory.

29. The network element of claim 27, wherein said content-addressable memory is a multi-feature content addressable memory.

30. The network element of claim 27, wherein said content-addressable memory is a feature based content-addressable memory bank.

31. The network element of claim 30, wherein said multi-feature packet processing rules are populated in said multi-feature classification memory according to a feature hierarchy.

32. A network element comprising:
means for identifying a classification of said packet; and
means for locating a multi-feature packet processing rule in a multi-feature classification memory using said classification.

33. The network element of claim 32, further comprising:
means for processing said packet according to said multi-feature packet processing rule.

34. The network element of claim 32, wherein said classification is based on a plurality of parameters of said packet.

35. The network element of claim 33, further comprising:
means for receiving said packet;
means for finding a match for said classification in a content-addressable memory; and
means for receiving an index from said content-addressable memory for said multi-feature packet processing rule in said multi-feature classification memory.

36. The network element of claim 35, further comprising:
means for using said index to receive said multi-feature packet processing rule from said multi-feature classification memory.

37. The network element of claim 35, wherein said content-addressable memory is a multi-feature content addressable memory.

1 38. The network element of claim 35, wherein said content-addressable
2 memory is a feature based content-addressable memory bank.

1 39. The network element of claim 35, wherein said multi-feature packet
2 processing rules are populated in said multi-feature classification memory according
3 to a feature hierarchy.

1 40. A computer program product for processing a packet, encoded in
2 computer readable media, said program product comprising a set of instructions
3 executable on a computer system, said set of instructions is configured to
4 populate a plurality of multi-feature packet processing rules in a multi-feature
5 classification memory; and
6 populate an associated content-addressable memory with a plurality of indices
7 of said plurality of multi-feature packet processing rules in said multi-
8 feature classification memory.

1 41. The computer program product of claim 40, wherein said set of
2 instructions is further configured to:
3 identify a classification of said packet; and
4 use said classification to identify said multi-feature packet processing rule.

1 42. The computer program product of claim 41, wherein said classification
2 is based on a plurality of parameters of said packet.

1 43. The computer program product of claim 41, wherein said set of
2 instructions is further configured to:
3 receive said packet;
4 find a match for said classification in said associated content-addressable
5 memory; and
6 receive one of said indices from said associated content-addressable memory
7 for one of said multi-feature packet processing rules in said multi-
8 feature classification memory.

1 44. The computer program product of claim 43, wherein said set of
2 instructions is further configured to:
3 use said index to receive said multi-feature packet processing rule from said
4 multi-feature classification memory.

1 45. The computer program product of claim 43, wherein said content-
2 addressable memory is a multi-feature content addressable memory.

1 46. The computer program product of claim 43, wherein said content-
2 addressable memory is a feature based content-addressable memory bank.

1 47. The computer program product of claim 46, wherein said multi-feature
2 packet processing rules are populated in said multi-feature classification memory
3 according to a feature hierarchy.

1 48. A computer program product for processing a packet, encoded in
2 computer readable media, said program product comprising a set of instructions
3 executable on a computer system, said set of instructions is configured to
4 identify a classification of said packet; and
5 locate a multi-feature packet processing rule in a multi-feature classification
6 memory using said classification.

1 49. The computer program product of claim 48, wherein said set of
2 instructions is further configured to:
3 processing said packet according to said multi-feature packet processing rule.

1 50. The computer program product of claim 48, wherein said classification
2 is based on a plurality of parameters of said packet.

1 51. The computer program product of claim 49, wherein said set of
2 instructions is further configured to:
3 receive said packet;
4 find a match for said classification in a content-addressable memory; and
5 receive an index from said content-addressable memory for said multi-feature
6 packet processing rule in said multi-feature classification memory.

1 52. The computer program product of claim 51, wherein said set of
2 instructions is further configured to:
3 use said index to receive said multi-feature packet processing rule from said
4 multi-feature classification memory.

1 53. The computer program product of claim 51, wherein said content-
2 addressable memory is a multi-feature content addressable memory.

1 54. The computer program product of claim 51, wherein said content-
2 addressable memory is a feature based content-addressable memory bank.

1 55. The computer program product of claim 51, wherein said multi-feature
2 packet processing rules are populated in said multi-feature classification memory
3 according to a feature hierarchy.